# 7.0 Summary and Conclusions

The Air Mobility Command must have the capability to support operations anywhere in the world from the continental US. To do this they need secure, dependable, worldwide information/communications and global range transports. Advanced technology offers the opportunity to satisfy these needs at reasonable cost. Commercial developments of satellite and fiber optic communication systems will provide global, wide bandwidth data capability. These systems should be the bases for the necessary communications for global reach mobility.

Continued development of advanced materials should support two elements critical to global range. Advanced high temperature materials will be the key to major improvements in engine performance. The second will be the development of low cost composites. Developments on the F-22 with injection molded thermoplastics point the way to low cost major structural components with very few parts. Continued emphasis on low-cost manufacturing of advanced materials should make it possible to have lower weight (longer range) transports in the future. Another benefit of the low-cost manufacturing (and reduced part count) is improved smoothness and aerodynamic efficiency. These will all contribute to a new transport weighing under a million pounds and capable of carrying 150,000 pounds of payload for 12,000 nautical miles.

The requirements to support operations in remote areas will place a premium on improved airdrop capability. Most of the elements exist today to do large-scale (60,000-75,000 pound) precision airdrop. However, a more accurate GPS navigation system, wind profile measurement, and improved delivery systems must be integrated to effect this capability. A big challenge is to invent a low-cost delivery system to replace the parasail.

An advanced technology which can really help mobility aircraft is directed energy used as a defensive system. Mobility aircraft do not have the agility to evade missiles, but can provide the space and power needed to utilize the logical applications of this technology. It will provide a much needed survivability enhancement.

The advanced technology of virtual reality can enhance mobility training. The use of computer-generated imagery and advanced three-dimensional holographic displays can improve training, operational planning and rehearsal training. These will be possible by combining simulators and real equipment at distant locations *via* wide bandwidth data links. There will be commercial developments of virtual reality which will make it easy for the Air Force to adapt. The mobility command will benefit from the improved level of reality and it will aid them in also adapting to worldwide communication developments.

The key elements of the recommended advanced systems are summarized in the table 7.0-1.

*Table 7.0-1: Mobility Recommended Systems*

| | **Information Dominance** | **Global Range Transport** | **Precision/ Large Scale Airdrop** | **Directed Energy Self-Defense** | **Virtual Reality Applications** |
|---|---|---|---|---|---|
| **Importance to Air Force** | Vital for $C^4I$, supports RTIC | Supports all global reach missions | Improves flexibility and survivability | Improves survivability | Joint exercises and training |
| **Effectiveness benefit** | Improves $C^2$ and survivability | Improves reaction time and reliability | Reduces forward infrastructure | Increases probability of mission success | Improves mission effectiveness |
| **Affordability** | Moderate | Good | Moderate | Moderate | No impact |
| **Key Technical Issues** | Wide-band global $C^4$ and Nav nets | Low-cost composites, very high performance engines | Wind Measurement | Low power laser and system integration | Synthetic environment generation, physical sensory systems |
| **Commercial Development** | Yes, but needs tailoring | Probably | Limited | No | Yes, but needs tailoring |